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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/050,129

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03/24/2006

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EXAMINER

TSE, YOUNG TOI

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 03/24/2006.

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/050,129

Applicant(s)

GRAZIANO ET AL.

Examiner

YOUNG T. TSE

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-17 and 19-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-17 and 19-26 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03292005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings were received on January 11, 2006. These drawings are acceptable.

Specification

2. The disclosure is objected to because of the following informalities: in the Brief Description of the Drawings discussed from page 5, line 22 to page 8, line 3, the Applicants are requested to clarify the order of the embodiments of the present invention. For example, Figures 6-13 are identified as an embodiment of the fifth aspect of the present invention, however, Figures 15-20 are identified as an embodiment of the third aspect of the present invention and Figures 21-28 are identified as an embodiment of the fourth aspect of the present invention. Appropriate correction is required.

Claim Objections

3. Claims 10-11, 14-17 and 19-26 are objected to because of the following informalities:

In line 2 of both claims 10 and 23, "operate" should be "operates".

In claim 11 (line 3) and claim 24 (line 2), "a plurality of rates of interest" is suggested change to "a plurality of data rates".

In claim 14, line 4, "the first modem" should be "the first modem to the second modem".

In claim 19, lines 2-3, "a plurality of modems" should be "the first modem and the second modem".

The dependent claims 15-17, 19-22 and 25-26 are objected to because they are depended upon the independent claim 14.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 6, 8-9 and 13-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 1 of claims 6 and 12-13, the phase "the steps" lacks antecedent basis because claim 1 recites four different steps. Therefore, the Applicants are requested to clarify exactly what are the steps.

The steps recited in claim 8 lack connection or cooperation with the precedent claims 1 and 7 and the estimating step lacks connection or cooperation with the sampling or computing step.

The steps recited in claim 9 also lack connection or cooperation with the precedent claims 1 and 7-8.

The preamble of claim 14 recites a system for conducting symbol rate negotiation and determining a preferred rate, however, the body of claim 13 recites a data rate determining module for determining a data rate. It is unclear what is the difference between “the preferred rate” and “the data rate”?

The modules recited in claim 20 lack connection or cooperation with the precedent claim 14.

The modules recited in claim 21 also lack connection or cooperation with the precedent claims 14 and 20 and the transmit estimating module lacks connection or cooperation with the transmit sampling module or the transmit transform computing module.

The modules recited in claim 22 also lack connection or cooperation with the precedent claims 14 and 20-21.

The dependent claims 15-17, 19 and 23-26 are rejected to because they are depended upon the independent claim 14.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4, 6-17 and 19-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Betts et al. (U.S. Patent No. 5,475,711) hereafter “Betts”.

Betts discloses a channel capacity modulation system in Figure 1 comprising a first modem 110 and a second modem 120 for communication with each other over communication channels 101 and 102.

The second modem 102 comprises a signal-to-noise (SNR) circuit 200 performs a frequency dependent noise spectrum analysis from which frequency domain information of the noise signal is output by discrete Fourier transform techniques; a spectrum analyzer 300 provides information indicative of a frequency dependent amplitude response of the communication channel 101 without interrupting or affecting the data traffic through the modem 120. The first modem 110 includes a compute block 115 calculates the optimum boundary conditions of the communication channel 101 from the noise spectrum analysis and the frequency dependent amplitude provided by the modem 120. The compute block 115 alternatively may be located in the modem 120. See col. 3, lines 25-55 and col. 4, lines 15-40.

Figure 2 shows the detailed embodiment of the SNR circuit 200 of Figure 1.

Figure 3 shows the detailed embodiment of the spectrum analyzer 300 of Figure 1.

Figure 4 illustrates the operation of the channel capacity communication system with the desired functionality including criteria for the optimization process.

Figure 5 illustrates in greater detail some of the functions provided in the flow chart of Figure 4.

Figure 6 illustrates in greater detail some of the functions provided in the flow chart of Figure 5.

With respect to claims 1, 4, 11, 14, 17 and 24, the second modem 120 receives a signal from the first modem 110; determines the information conditions of the communication channels 101 or 102 associated with the first modem 110; calculates an estimate of channel capacity of a plurality of frequency domain sub-bands, for example, generates by an inverse discrete Fourier transformer in a transmitter circuit or a discrete Fourier transformer in a receiver circuit of the modem 110 or 120 (col. 1 lines 43-49 and col. 3, lines 49-55); and determines a data rate of the communication channel based on the estimate of channel capacity (col. 5, lines 34-67). Although Betts does not explicitly show or suggest that each sub-band is sufficiently small such that noise within the sub-band is approximately additive white and Gaussian noise, as amended in claims 1 and 14. It is inherent that in most cases, the additive Gaussian white noise in a transmission channel is exclusive in a receiver circuit because its noise is so small to be effected, especially the noise has been divided into a plurality of sub-bands or sub-carriers.

Applicants note Jourjine et al. (U. S. Patent No. 6,430,528 B1) shows two equations (4) and (5) to form received mixture signals $x_1(t)$ and $x_2(t)$ which do not describe the case when non W-disjoint orthogonal noise is present, such as Gaussian white noise. However, in practical applications, where the noise power is sufficiently small, the accuracy of the channel estimates described herein will not be effected. See column 7, line 67 to column 8, line 3.

Therefore, it is inherent that the estimation circuit in Betts receiver modem calculates the estimation of the channel capacity of a plurality of frequency domain sub-

bands, wherein each sub-band is sufficiently small such that noise within the sub-band is approximately additive white and Gaussian noise.

With respect to claims 2-3, 7-9, 15-16, and 20-22, the determination or estimation of the signal power, the noise power, and the signal and noise power is determined by the SNR circuit 200 and the spectrum analyzer 300 shown in figures 2 and 3.

With respect to claims 6 and 19, the communication between the two modems 110 and 120 is performed during a line probe session. See col. 8, line 11-22.

With respect to claims 10 and 23, a modem operates according to the G.SHDSL standard for spectral compatibility is well known in the modem communications art.

With respect to claims 12-13 and 25-26, the communication of the modems 110 and 120 is communicated from a digital terminal equipment (DTE), which is well known to a person skill in the art, such as, a customer premise equipment or a central office. See col. 3, lines 29-31.

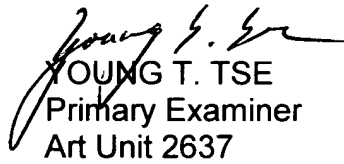
Allowable Subject Matter

8. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOUNG T. TSE whose telephone number is (571) 272-3051. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


YOUNG T. TSE
Primary Examiner
Art Unit 2637